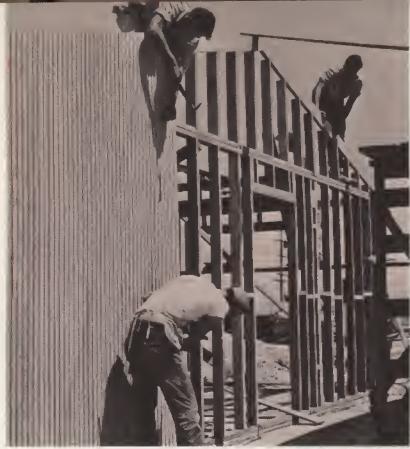


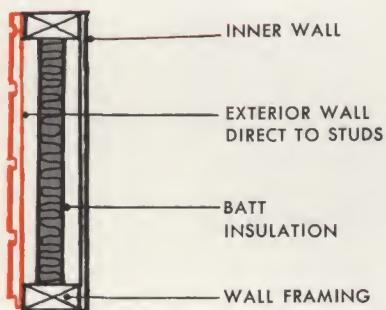
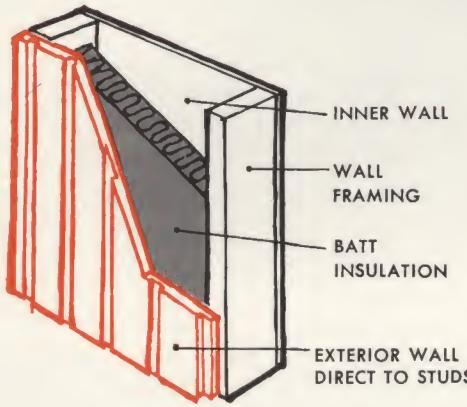


Sturd-i-wall...

the sign of quality construction



Sturd-i-wall Construction and...



In today's light construction market, soaring labor costs, combined with the press for time and the demand for homes, has made it necessary to develop new, modern, cost-saving methods of building.

One significant development is the Douglas Fir Plywood Association's Sturd-i-wall.

Simple and time saving, this economical method of construction eliminates the dual cost of siding and sheathing by applying strong, light, durable plywood directly to the studs. Used as a combination siding-sheathing, plywood sharply reduces your labor and material costs. And you lose nothing in the way of strength, warmth or rigidity.

Structurally sound, Sturd-i-wall meets FHA acceptances. In the new Minimum Property Standards, the application of $\frac{3}{8}$ " plywood directly to studs spaced 16" o.c. (paragraph 903-6.3) is accepted. Actually, a $\frac{3}{8}$ " thick plywood wall with openings is twice as rigid, and nearly 3 times as strong as a standard 1" x 8" diagonally sheathed wall with openings.

With Sturd-i-wall construction it may be necessary in colder, more severe climates to use 2" foil-faced batts instead of 1½" paper-faced economy batt insulation to develop the "U" values the climate dictates. However, the cost difference is little. Dollar for dollar and inch for inch, you can obtain more insulating value with separate insulation between the studs than through the addition of sheathing.

its advantages

Sturd-i-wall construction offers you these 5 big advantages:

1. Strength

2. Rigidity

3. Warmth

4. Low Cost

5. Quality Construction

in addition to the advantages of Sturd-i-wall construction,

PLYWOOD OFFERS YOU . . .

LARGE SIZE—LIGHT WEIGHT

Large, work-speeding panel sizes (4' x 8' and larger) simplify construction to provide savings in labor and handling costs. Panels weigh less than most construction materials of equivalent strength.

STRENGTH AND RIGIDITY

Plywood's cross-laminated construction and two-way strength make it ideal for diaphragm construction, structural bracing or plate-action applications. This is especially important in those areas affected by hurricanes and earthquakes.

RESISTANCE TO SPLITTING AND IMPACT

Plywood is not brittle or "tinny." It is able to shrug off abuse that would shatter other heavier materials because its construction easily absorbs sharp blows, kicks or heavy impacts. Panels will not split—even when nails are driven close to the edge.

DIMENSIONAL STABILITY

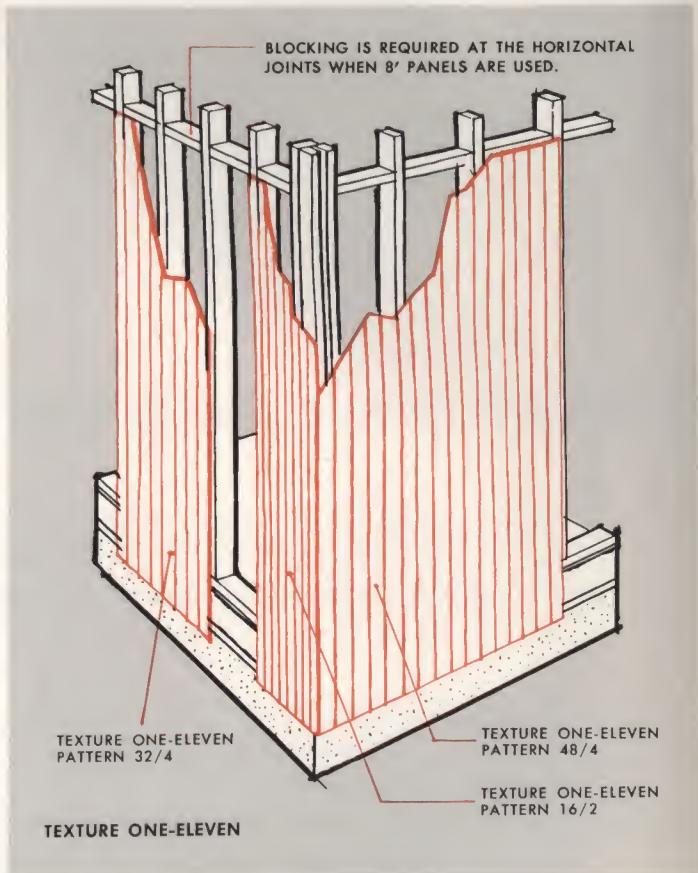
Joint opening is not a major problem with plywood construction, for plywood is shipped dry from the factory. It is never "green." Its cross-lamination restricts expansion and contraction within the individual plies. From oven-dry to complete saturation, a plywood panel will shrink or swell less than 2/10 of 1 per cent.

EASY TO WORK

Special tools or especially trained labor is not required because plywood works well with ordinary hand tools. Even the overlaid surfaces of Medium Density and High Density plywoods are easy to work.

NAIL BEARING

Plywood's diaphragm strength can be attributed to its large panel size and nail bearing properties.



Sturd-i-wall construction methods . . .

Regardless of the type of Sturd-i-wall you select, be certain to use the correct type and grade of plywood. The following grades of Exterior-type plywood are recommended by the Douglas Fir Plywood Association:

1. Texture One-Eleven
2. Medium Density Overlaid Plywood
3. A-C Exterior-Type Plywood

Other specialized products such as brushed, striated and embossed plywood panels may also be used in Sturd-i-wall construction. Bevel or lap siding are also available on special order in widths of 12", 16" and 24".

A-C
DOUGLAS FIR
CS 45-60

EXT-DFPA
A-C
DOUGLAS FIR
CS 45-60

DFPA TESTED QUALITY

A-C Exterior-type plywood is made with the same waterproof bond that is used in the manufacture of Texture One-Eleven and Medium Density Overlaid plywood. New developments in spray techniques using epoxy resins promises even wider use of sanded exterior panels in the future.

TEXTURE ONE-ELEVEN
EXT-DFPA
DOUGLAS FIR
CS 45-60

EXT-DFPA
DOUGLAS FIR
CS 45-60

DFPA TESTED QUALITY

Standard Texture One-Eleven is an Exterior-type plywood having parallel grooves $\frac{1}{4}$ " deep and $\frac{3}{8}$ " wide spaced 2" or 4" apart. It is an unsanded panel and has shiplapped edges.

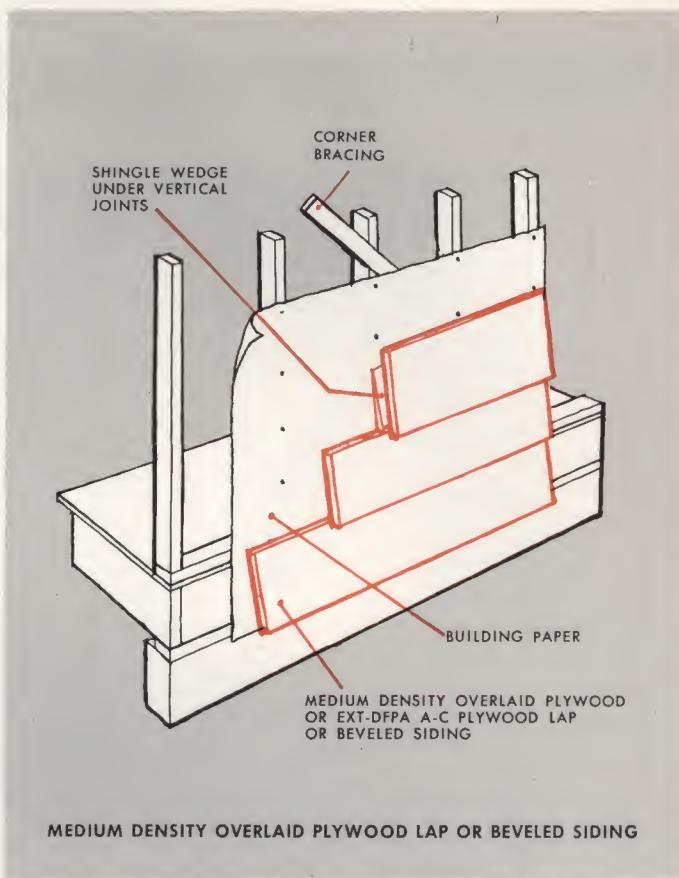
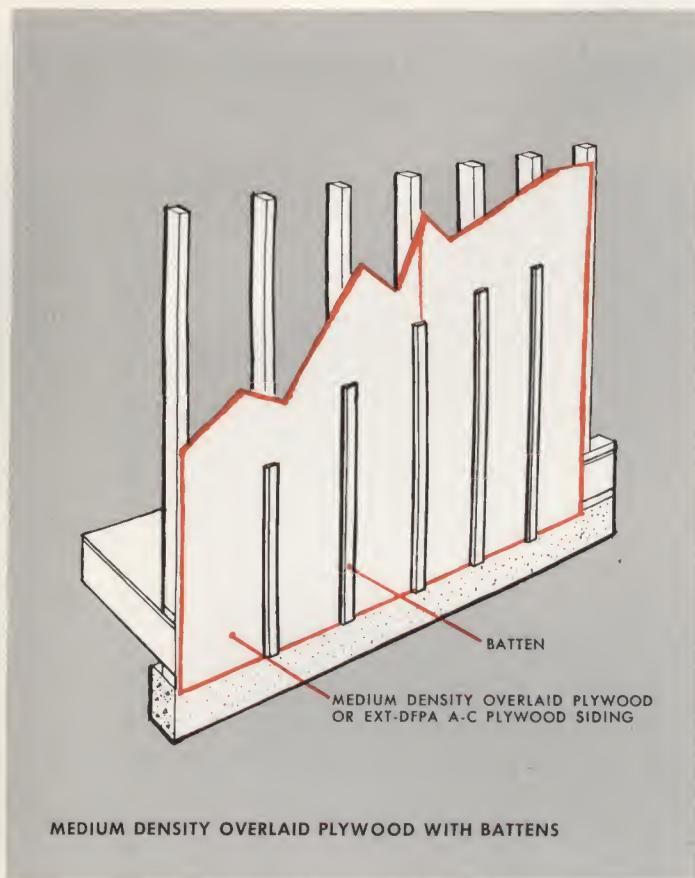
EXT-DFPA

EXT-DFPA

DFPA TESTED QUALITY

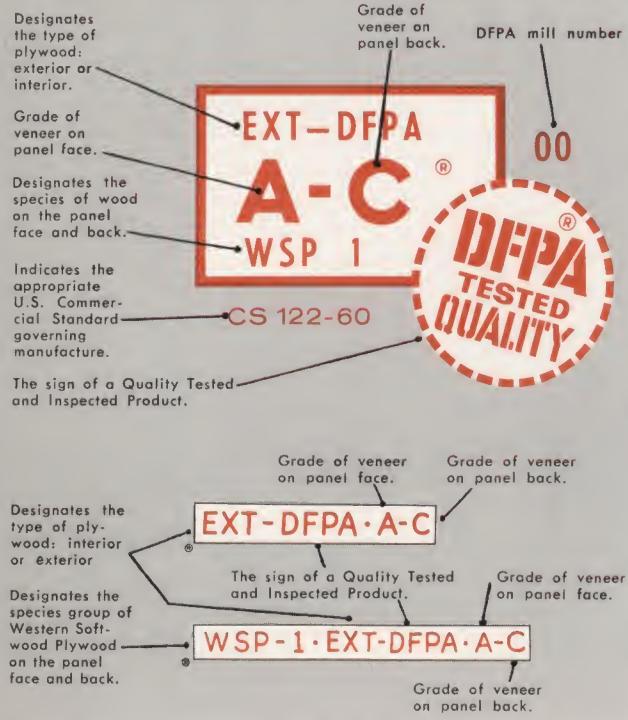
Medium Density Overlaid plywood is an Exterior-type plywood with a smooth, hard, fused-resin fiber overlay. Its surface provides a superior paint base.

These panels are available in Douglas fir and Western Softwood species. The gradeTrademark appearing on the Western Softwood panels bears the designation WSP and a number indicating the group species. The Douglas fir panel bears the mark "Douglas Fir." See the sample gradeTrademark at the right.



Using the right plywood

TYPICAL DFPA BACK STAMPS AND EDGE MARKS



SAMPLE SPECIFICATION

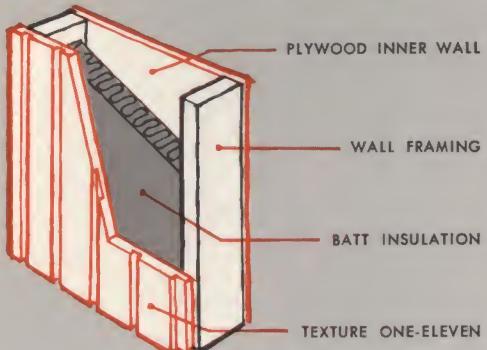
To be certain you receive the correct DFPA Tested Quality Plywood, specify it in this manner:

All plywood used for siding shall be of (specify type and grade) Douglas fir (or Western Softwood) plywood, manufactured in accordance with U. S. Commercial Standard CS 45 (or CS 122 for Western Softwood). Each panel shall carry the EXT-DFPA grade-trademark of the Douglas Fir Plywood Association as evidence of its waterproof glue line. Thickness, application details and nailing shall be as indicated on engineering drawings or as recommended by DFPA.

Insulation values for typical wall constructions

Sturd-i-wall CONSTRUCTION

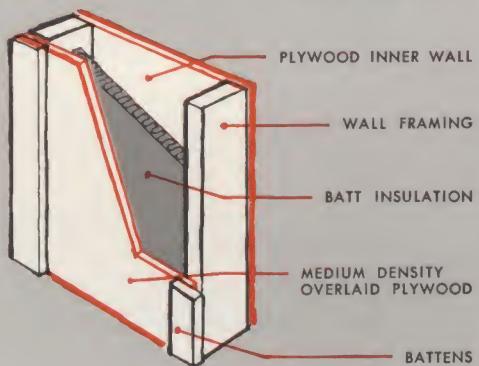
Cold Climate—Outside Design Temperature -30° F.



	Resistance
Outside air	0.17
Texture One-Eleven	0.77
Air space	0.91
2" foil-faced glass fiber batt	9.23
Air space	0.91
1/4" plywood	0.32
Inside air	0.61
<hr/>	
	R=12.92

$$U=0.077 \text{ Btu/hr./sq. ft./}^{\circ}\text{temp. diff.}$$

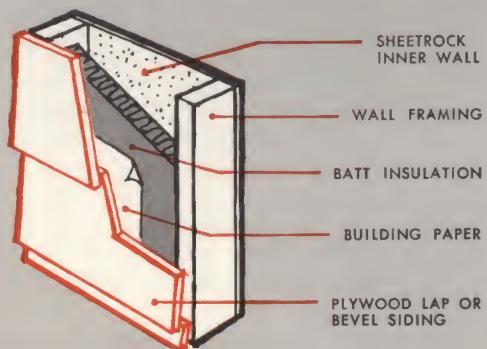
Warm Climate—Outside Design Temperature 15° F.



	Resistance
Outside air	0.17
3/8" medium density plywood and battens	0.48
Air space	0.91
1" blanket	3.70
Air space	0.91
1/4" plywood	0.32
Inside air	0.61
<hr/>	
	R=7.10

$$U=0.14$$

Moderate Climate—Outside Design Temperature 0° F.

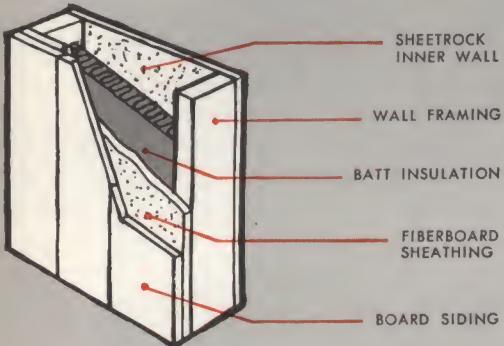


	Resistance
Outside air	0.17
3/8" plywood lap or bevel siding and paper	0.79
Air space	0.91
1 1/2" mineral wool blanket	5.55
Air space	0.91
1/2" sheetrock	0.38
Inside air	0.61
<hr/>	
	R=9.32

$$U=0.11$$

CONVENTIONAL CONSTRUCTION

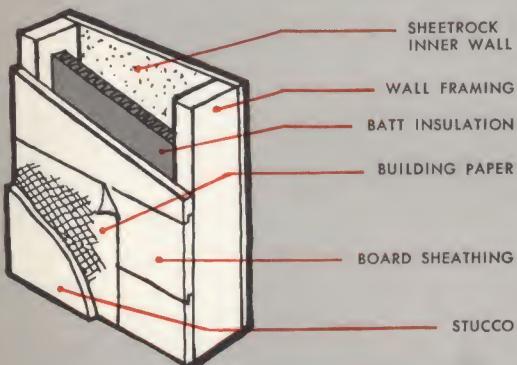
Cold Climate—Outside Design Temperature -30° F.



	Resistance
Outside air	0.17
$\frac{3}{4}$ " board siding	0.94
$25/32$ " fiberboard sheathing	2.37
Air space	0.91
$1\frac{1}{2}$ " glass fiber batt	5.55
Air space	0.91
$\frac{1}{2}$ " sheetrock	0.38
Inside air	0.61
<hr/>	
$R=11.84$	

$$U=0.084$$

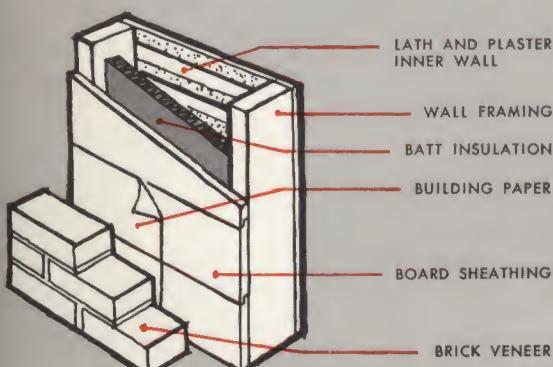
Warm Climate—Outside Design Temperature 15° F.



	Resistance
Outside air	0.17
Stucco	0.08
$\frac{3}{4}$ " board sheathing and paper	1.16
Air space	0.91
1 " blanket	3.70
Air space	0.91
$\frac{1}{2}$ " sheetrock	0.38
Inside air	0.61
<hr/>	
$R=7.92$	

$$U=0.13$$

Moderate Climate—Outside Design Temperature 0° F.



	Resistance
Outside air	0.17
4 " brick veneer	0.80
Air space	0.91
$\frac{3}{4}$ " board sheathing and paper	1.16
Air space	0.91
1 " mineral wool blanket	3.70
Air space	0.91
$\frac{3}{4}$ " lath and plaster	0.40
Inside air	0.61
<hr/>	
$R=9.57$	

$$U=0.10$$

Bracing strength . . .

Tests conducted by the Department of Agriculture's U. S. Forest Products Laboratory and DFPA's Applied Research facility show that plywood nailed directly to the studs has the required rigidity to serve as a combination siding and sheathing, as in Sturd-i-wall construction.

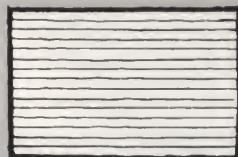
For example, a wall with openings with $\frac{1}{4}$ " plywood nailed directly to the studs is twice as rigid and nearly three times as strong as a standard 1" x 8" diagonally sheathed wall with openings. Panels $\frac{3}{8}$ " thick should, of course, make the wall even stronger and more rigid.

The independent tests conducted by these two organizations (FPL and DFPA) clearly show that a plywood wall has more strength and rigidity than most commonly accepted braced, 1" lumber sheathed walls.

Texture One-Eleven (in both 16" and 32" panel widths) exceeds the minimum values set by FHA for the omission of bracing when the panels are nailed with 8d casing nails spaced 4" o.c. at the panel edges and 8" on the intermediate bearings. Stiffness ranged from 10 to 60 times FHA's required values for specified load levels. The strength values in the 16" and 32" panels also exceeded FHA requirements by 7% and 24% respectively. The standard 48" wide panels naturally have better strength and stiffness qualities.

Construction

1" x 8" LUMBER



2 8d nails per stud crossing

1.0

1.0

1" x 8" LUMBER



2 8d nails per stud crossing
1 x 4 inch let-in bracing

2.6

3.6

1" x 8" LUMBER



2 8d nails per stud crossing
1 x 4 inch let-in bracing

4.2

3.5

1" x 8" LUMBER

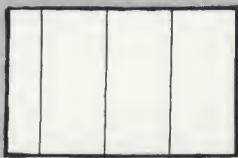


2 8d nails per stud crossing

4.3

8

1/4" PLYWOOD

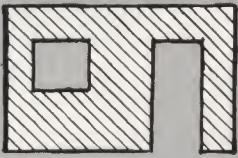


6d nails spaced 5" on all edges of plywood, 10" on intermediate studs

4.2

5.2

1" x 8" LUMBER

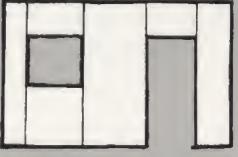


2 8d nails per stud crossing

1.0

1.3

1/4" PLYWOOD



6d nails spaced 5" on all edges of plywood, 10" on intermediate studs

2.0

2.8

U. S. Forest Products Laboratory Tests
(9'x14' sections)

1. CONVENTIONAL CONSTRUCTION

Your Siding

material _____
labor _____

Sheathing

material _____
labor _____

Corner Bracing (IF REQUIRED)

material _____
labor _____

Building Paper

material _____
labor _____

Insulation

material _____
labor _____

TOTAL _____

2. Sturd-i-wall CONSTRUCTION*

Texture One-Eleven Siding or 3/8" Plywood Panel Siding

material _____
labor _____

Insulation

material _____
labor _____

TOTAL _____

3. Sturd-i-wall SAVINGS

1. Conventional Construction

2. Sturd-i-wall Construction

3. Number 1 minus Number 2 savings with Sturd-i-wall

Cost savings . . .

When plywood is nailed directly to the studs and it serves as both siding and sheathing, the savings in labor and materials are obvious—especially when you compare this construction with the conventional two-layer siding and sheathing applications found in so many of today's new homes.

Plywood's large panel size (which saves you up to 50% in your labor and handling costs) and high nail bearing strength provides bracing strength to the walls and eliminates the need for corner bracing (see page 8). When the panels are cut into 12", 16" or 24" widths and applied as lap or bevel siding (see page 5), diagonal corner bracing is required just as it is with any horizontal board-sheathed walls.

The thermal value comparisons shown on pages 6 and 7 show that Sturd-i-wall construction is suitable, even in the coldest of climates. Slightly thicker batt or blanket insulation is required, of course, but the increased cost is negligible when you compare it with the other labor and material savings gained with Sturd-i-wall construction. Besides, more insulating value is achieved through added batt or blanket insulation than through the addition of sheathing.

Building paper isn't required behind plywood panel siding. The joints are backed by the studs, and they effectively resist moisture and wind infiltration. When battens are used with Medium Density Overlaid plywood "board and batten" construction, additional weather-proofing will result. The ship-lapped joints of Texture One-Eleven afford protection in themselves.

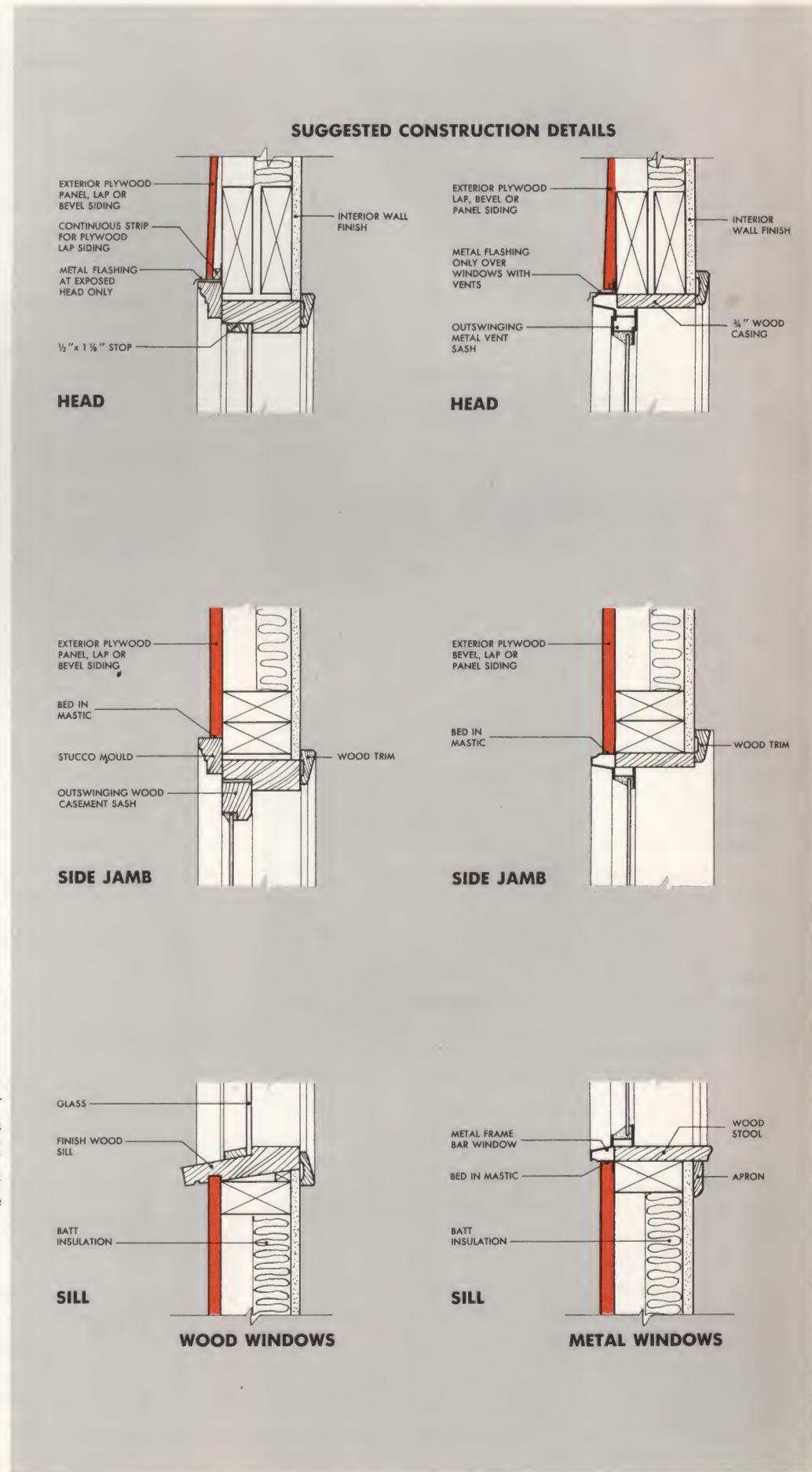
How much will you save with Sturd-i-wall construction and all its advantages?

Figure it out for yourself . . . it's as easy as 1, 2, 3. Use these estimating forms and see just how many dollars and cents Sturd-i-wall construction will put in your pocket.

Suggested construction details

Nailing schedule

Finishing



NOTE:

Numerous window manufacturers provide for Sturd-i-wall construction through the use of reversible blind stops or jamb extenders. The stops and extenders provide adjustments for the various overall wall thicknesses.

NAILING SCHEDULE

CONSTRUCTION	NAIL SIZE AND TYPE	PANEL EDGES	NAIL SPACING (INCHES C TO C) Intermediate Bearings
TEXTURE ONE-ELEVEN*	8d non-corrosive casing	4	8
PANEL SIDING $\frac{3}{8}$ "	6d non-corrosive casing or box	6	12
$\frac{1}{2}$ "	8d non-corrosive casing or box	6	12
$\frac{5}{8}$ "	8d non-corrosive casing or box	6	12
LAP OR BEVEL SIDING			
$\frac{3}{8}$ " (lap)	6d non-corrosive casing or box	One nail per stud along bottom edge	4" at vertical joints; 6" to 8" at studs
$\frac{1}{2}$ " (bevel)	6d non-corrosive casing or box		
Other	8d non-corrosive casing or box		

*Start nails $\frac{1}{2}$ " back from edge and slant drive. Nail flush but do not set.

FINISHING

TEXTURE ONE-ELEVEN PLYWOOD

general: The finishing objective is:

1. To retain the natural texture of the wood and its characteristic dull sheen.
2. To give uniform color over the dark and light parts of the grain as well as over knots.
3. To preserve appearance at low cost with minimum maintenance.

for outdoor use: a **highly pigmented exterior stain** is recommended. It has six essential characteristics:

1. They are breather-type finishes.
2. They dry flat, without any gloss.
3. They penetrate but still leave a thin coating on the surface.
4. They produce uniform color. They are not transparent or translucent.
5. They almost, but not quite, hide the grain pattern.
6. They do not obliterate the natural surface texture with a hard paint film.

MEDIUM DENSITY OVERLAIRED PLYWOOD

PAINTING overlaid fir plywood, either pre-cut siding or standard panels, follows general procedure for fir plywood.

Seal all edges before application with exterior house paint primer, an exterior aluminum house paint, or paint consisting of 100 lbs. white lead paste, $1\frac{3}{4}$ gals. raw linseed oil, and one pint dryer. Apply by brush, preferably, without thinning.

Extensive field tests show that first quality house paints are best for overlaid fir plywood. Apply according to manufacturer's specification. Overlaid fir plywood siding requires a prime coat and at least one finish coat; two finish coats are best. For maximum performance, prime the back before application.

For best construction, provide vapor barrier on warm side of wall and observe other standard precautions to prevent condensation.

REGULAR EXTERIOR TYPE PLYWOOD

EXTERIOR FINISHING—General Data: For use where exposed to weather, water, or moisture, the best paint for regular wood is best for Exterior-type plywood. High grade exterior paints of either TLZ formulation or white-lead-and-oil give excellent service. Avoid paints which set to a hard, brittle film.

Edge Sealing: During assembly, seal all panel edges with a heavy application of high-grade exterior primer, aluminum paint or heavy lead-and-oil paint. This applies whether edges are exposed or lapped, butted or covered with moldings.

Painting Procedure: Three coats provide the best protection. **1. The initial or prime coat is most important!** A high grade exterior primer, thinned with 1 pint of pure raw linseed oil per gal. of paint, and brushed on, is recommended. An aluminum primer, compounded from aluminum paste and top quality long oil spar varnish, makes an excellent primer. **2 and 3.** Over the primer apply second and third coats according to manufacturer's directions.

How Builders Save With Sturd-i-wall Construction

Dale Forsberg, a Minot, North Dakota, builder, is sold on Sturd-i-wall construction. He saves \$275 per house.

But, Forsberg is not the only builder to realize substantial savings through the use of this type of construction. Robert Keck of Reco, Inc., Rapid City, South Dakota, builders, reports saving \$100 to \$350 per house—depending upon the type of construction replaced. In Duluth, Minnesota, Roy Bergstedt saves \$250 to \$350 per house in the \$15,000 to \$38,000 homes he builds. Bergstedt and Keck both favor the tightness Sturd-i-wall construction provides. This is particularly advantageous to them because their locations are subjected to a wide range of temperature extremes.

Rowland Van Ness, a builder in San Jose, California, reports saving more than \$150 per house. He uses $\frac{3}{8}$ " Exterior plywood nailed directly to the studs. And, Richard Grant, a developer of the 1,200-home Parkside tract in San Mateo, estimated his savings at \$125 per house. He used Texture 1-11 on his Sturd-i-wall homes.

This publication provides basic information only on the use of plywood in Sturd-i-wall construction. If additional information on the use of plywood in other applications is required, please write: Douglas Fir Plywood Association, 1119 "A" Street, Tacoma 2, Washington.

Other Plywood Use Data

U. S. Commercial Standard CS 45 (Douglas Fir Plywood)

U. S. Commercial Standard CS 122 (Western Softwood Plywood)

Construction Guide

Basic Facts About Fir Plywood Diaphragms

Fir Plywood for Today's Construction (S-61)



How Builders Save With Sturd-i-wall Construction

Dale Forsberg, a Minot, North Dakota, builder, is sold on Sturd-i-wall construction. He saves \$275 per house.

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Fir Plywood for Today's Construction (S-61)